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(54) **Control apparatus**

(57) A control apparatus comprising a control unit outputting a control signal controlling a servo motor and suppressing natural vibration of a controlled object including a motor and a machine driven by the motor while controlling the controlled object, comprising a frequency analysis unit analyzing a frequency component included in a torque command, an analysis control unit controlling the start or stopping of the frequency analysis unit, a de-

tection unit detecting a natural frequency of the controlled object from an analysis result of the frequency analysis unit, a band rejection filter receiving as input the torque command, stripping the command of the natural frequency component, and outputting the resultant command to the motor through a current control unit and servo amplifier, and a filter characteristic setting unit setting the frequency to be stripped at the filter based on the natural frequency detected by the detection unit.

Fig.1A

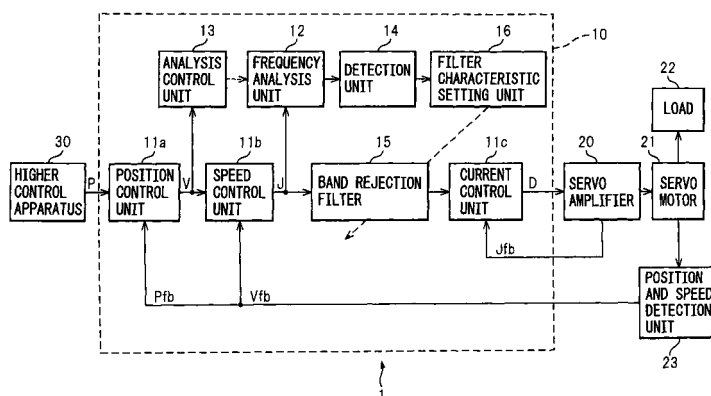
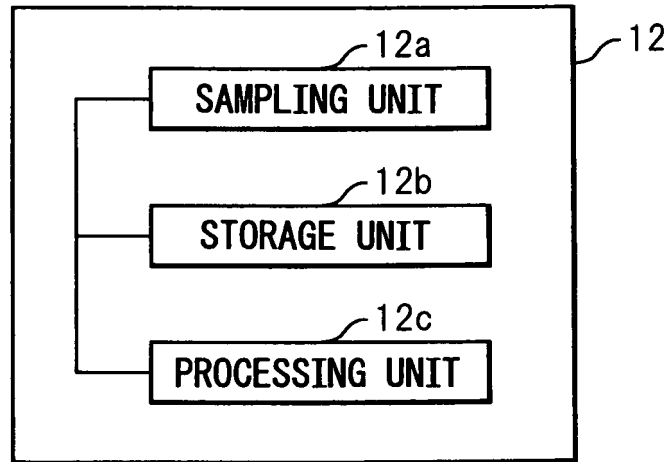


Fig.1B





EUROPEAN SEARCH REPORT

Application Number
EP 08 01 1541

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 132 790 A1 (FANUC LTD [JP]) 12 September 2001 (2001-09-12)	1,3	INV. G05B19/416
Y	* paragraph [0031] - paragraph [0032] * * paragraph [0113] - paragraph [0136] * * figures 1,14-17 *	2	
Y	EP 0 685 779 A1 (TOYOTA MOTOR CO LTD [JP]) 6 December 1995 (1995-12-06) * column 9, line 9 - column 13, line 18 * * column 17, line 5 - line 34 * * figures 1-6 *	1-2	
Y	US 4 195 265 A (VALI ENN [CA]) 25 March 1980 (1980-03-25) * the whole document *	1	
<p style="text-align: center;">-----</p> <p style="text-align: center;">-----</p> <p style="text-align: center;">-----</p>			<p>TECHNICAL FIELDS SEARCHED (IPC)</p> <p>G05B</p>
<p style="text-align: center;">-----</p> <p style="text-align: center;">-----</p> <p style="text-align: center;">-----</p>			
<p style="text-align: center;">The present search report has been drawn up for all claims</p>			
Place of search		Date of completion of the search	Examiner
Munich		26 February 2010	Marrone, Fabrizio
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03/82 (P04C01)



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-3

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
EP 08 01 1541

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-3

Control apparatus suppressing natural vibration

2. claim: 4

Natural vibration generation unit

3. claims: 5-6

Efficient detection unit

4. claim: 7

Control signal limiting unit

5. claims: 8-9

Reliable filter characteristic setting unit

6. claim: 10

Sampling interval changing unit

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 01 1541

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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26-02-2010

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